08-10-00

01/2000 FORM 1

TRANSMITTAL FORM FOR FILING PATENT APPLICATION

Attorney
Docket No.: SYNER-163XX

JC840 U.S. PTO
08/09/00

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JC962 U.S. PTO
09/634185
08/09/00

Express Mail No: EL418426735US

Date: August 9, 2000

BOX PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

First Named Inventor or Application Identifier: James S. Hiscock, et al.

Sir:

Transmitted herewith under 37 CFR § 1.53 for filing is the patent application of:

Inventors: James S. Hiscock, Kiwon Chang, Floyd Backes, Myles Kimmitt

Entitled: FLEXIBLE DATA OUTLET

[ ] This is a request for filing a [ ] **continuation** [ ] **divisional** [ ] **continuation in-part** application under §1.53(b) of prior Application No._____, filed _____ entitled:

Enclosed are:

[X] 12 pages of written description, claims and Abstract, inclusive

[X] 3 sheets of [X] informal [ ] formal drawings of Figs. 1-5 (one set)

[X] Oath or Declaration
- [X] Newly executed (original)
- [ ] Copy from prior application (37 CFR 1.63(d)) (for continuation/divisional). The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
- [ ] To be filed later

[X] Cover sheet and Assignment of the invention to: 3Com Corporation

[ ] Certified copy of a _____ application (if foreign priority is claimed) with letter claiming priority under Rule 55.

[ ] Information Disclosure Statement with __ citations

[ ] Preliminary amendment is enclosed.

[X] Return receipt postcard

[ ] Other:

TRANSMITTAL FORM FOR FILING PATENT APPLICATION (CONTINUED)

Attorney
Docket No.: SYNER-163XX

[ ] Verified statement of Small Entity status (§1.9 and §1.27)

[ ] Verified statement of Small Entity was filed in prior application. Status still proper and desired

[ ] Priority is claimed under 35 USC § 120 as indicated on the attached sheet 4.

[ ] Priority is claimed under 35 USC §119(a)-(d) as indicated on the attached sheet 4.

[X] Priority is claimed under 35 USC §119 (e) as indicated on the attached sheet 4.

[X] James F. Thompson is hereby appointed Associate Attorney by:
Registration No.: 36,699

Attorney of Record: Victor B. Lebovici
Registration No.: 30,864

[ ] **Power of Attorney** in the originally-filed application has been granted to one or more of the registered attorneys listed below. The attorneys listed below not previously granted power in the originally-filed application, as well as _____, are hereby given associate power:
Registration No.:

Stanley M. Schurgin, Reg. No. 20,979
Charles L. Gagnebin III, Reg. No. 25,467
Paul J. Hayes, Reg. No. 28,307
Victor B. Lebovici, Reg. No. 30,864
Eugene A. Feher, Reg. No. 33,171
Beverly E. Hjorth, Reg. No. 32,033
Holliday C. Heine, Reg. No. 34,346
Gordon R. Moriarty, Reg. No. 38,973

[ ] Cancel in this application original claims _____of the prior application before calculating the filing fee.

[ ] Add in this application claims _____ per amendment before calculating fee.

CLAIMS FILED:	MINUS BASE:	EXTRA CLAIMS:	RATE:	BASIC FEE:
				$690.00
Independent	1 - 3	= 0	x $78.00 =	0
Total	20 - 20	= 0	x $18.00 =	0
[ ] Multiple Dependent Claims (1st presentation)			+ $260.00 =	0
			SUBTOTAL FILING FEE	$690.00
Small Entity filing, divide by 2. (Note: verified statement must be attached per §1.9, §1.27, §1.28.)				0
			TOTAL Filing Fee	$690.00

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Attorney Docket
No.: SYNER-163XX

TRANSMITTAL FOR FILING PATENT APPLICATION (CONTINUED)

[X] The filing fee has been calculated above; a check in the amount of $690.00 is enclosed.

[ ] The filing fee will be submitted at a later date.

[X] In the event a Petition for Extension of Time under 37 CFR §1.17 is required by this paper and not otherwise provided, such Petition is hereby made and authorization is provided herewith to charge Deposit Account No. 23-0804 for the cost of such extension.

[X] The Commissioner is hereby authorized to charge payment of any additional filing fees under 37 CFR §1.16 associated with this communication or credit any overpayment to Deposit Account No. 23-0804.

[X] Customer Number 207

Address all future communications to:

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Attorney of Record: James F. Thompson
Registration No. 36,699

TRANSMITTAL FOR FILING PATENT APPLICATION (CONTINUED)

[ ] Priority is claimed under 35 USC § 120 of prior Application(s) No. _____, filed_____, entitled:

[ ] The above-identified application(s) is/are assigned of record to:

[ ] Priority is claimed under 35 USC § 119 (a)-(d) of the following application(s).

(Application Number)	(Country)	(Filing Date)
(Application Number)	(Country)	(Filing Date)
(Application Number)	(Country)	(Filing Date)

[ ] The above-identified application(s) is/are assigned of record to:

[X] Priority is claimed under 35 USC § 119 (e) of the following provisional application(s).

(Application Number)	(Filing Date)
60/201,956	May 5, 2000
(Application Number)	(Filing Date)
(Application Number)	(Filing Date)

[ ] The above-identified provisional application(s) is/are assigned of record to:

[ ] The claim of small entity status in the above-identified provisional application(s) is made in this application and a copy of the small entity form(s) from the provisional application(s) is/are enclosed.

SUBMIT IN TRIPLICATE

231468

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TITLE OF THE INVENTION

Flexible Data Outlet

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority under 35 U.S.C. §119(e) of Provisional Patent Application No. 60/201,956, filed May 5, 2000, entitled "Self Service Data Interface and Flexible Data Outlet".

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

--Not Applicable--

BACKGROUND OF THE INVENTION

The present invention is related to the field of interfaces between data users and a data infrastructure such as a computer network in a building or company.

In traditional information technology (IT) installations, the connection between a user, such as an office occupant with a personal computer, and the broader network with its resources such as file servers, printers, etc., is realized by a cable extending between a wall jack in the user's office and centrally-located interface equipment such as multiplexers, switches, or the like. In order for a user to obtain any information about the network and its resources, referred to herein as the "data infrastructure", it is necessary that this connection between the user's computer and the centralized resource be working properly. If the connection to the user is not working, the user is typically required to contact IT maintenance personnel and wait for the problem to be diagnosed and corrected. Such a situation increases the demand on IT support organizations and contributes to decreased user productivity.

Additionally, in many IT installations the functional interface between the data infrastructure and user connection points is very rigidly defined. For example, the interface may

operate according to a specific high-level network protocol, such as Novell®, that the user's computer does not support. As a result, a user whose computer does not conform to the functional requirements of the interface, such as a traveling user with a portable computer configured for a different network type, may be unable to connect to the data infrastructure, or may be prevented from making full use of its capabilities.

It is desirable to reduce the demand on IT support resources, and to enable user equipment to more readily interface to data infrastructures having different functional capabilities and requirements.

BRIEF SUMMARY OF THE INVENTION

In accordance with the present invention, a flexible data outlet is disclosed that brings data connectivity and services closer to the user, enabling more widespread use of data services along with greater user self-sufficiency. The outlet is compact and can be used with existing wiring, such as home or office telephone wiring, and thus is readily deployed in any of a variety of environments, such as a home, small office, or areas of a larger building such as a commercial office building or public transportation facility.

In particular, the data outlet includes a housing configured for placement in an operating area of a user, such as on a wall adjacent to a user's work space. User interface circuitry in the housing provides an interface to user equipment generally located in the user operating area, including a user telephone device and a user data device such as a personal computer. The user interface circuitry includes a link-layer interface, such as an Ethernet media access control (MAC) interface, to the user data device.

Premises interface circuitry in the housing provides an interface to premises equipment located generally outside the user operating area. The premises equipment includes data processing

equipment as well as telephone communications equipment providing access to a public telephone network. Bridge circuitry in the housing provides communications connections between the user interface circuitry and the premises interface circuitry in a flexible manner, enabling the provision of a variety of information services to the user.

Other aspects, features, and advantages of the present invention are disclosed in the detailed description that follows.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The invention will be more fully understood by reference to the following Detailed Description in conjunction with the Drawing, of which:

Figure 1 is a block diagram of a communications system incorporating a data outlet according to the present invention;

Figure 2 is a block diagram of the data outlet of Figure 1 having a first configuration;

Figure 3 is a block diagram of the data outlet of Figure 1 having a second configuration;

Figure 4 is a rear perspective view of a first type of housing for the data outlet of Figure 1; and

Figure 5 is a rear perspective view of a second type of housing for the data outlet of Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

In Figure 1, a data outlet 10 provides communications interfaces between user data and/or telephone devices (not shown) and premises equipment 12 located in a building or perhaps a campus of buildings. The collection of premises equipment 12 is also referred to herein as the "data infrastructure". The user devices connect to the data outlet 10 via some combination of wired links and wireless links, such as wired links 14, 16 and wireless link 18 as shown. In Figure 1, the links 14 and 18 are links to data devices such as a personal computer, a palmtop

computer, etc., and the link 16 is a link to a telephone, which may be either an analog or digital telephone. Although not shown in Figure 1, the data outlet 10 may also provide a wireless link to a cellular telephone (not shown) or other personal communication device.

The premises equipment/data infrastructure 12 may include any of a variety of equipment, ranging from a small number of relatively unsophisticated devices to a much larger number of sophisticated devices. For example, in a home the premises equipment 12 may include interfaces to one or more additional data outlets located elsewhere in the home, a modem to provide access to remote data services, and an interface to the public telephone network. In a slightly more sophisticated configuration, the premises equipment 12 in a home may also include a small local area network (LAN) to which the data outlets 10 are connected, along with a central server computer that provides shared services such as printing, Internet access, file storage and retrieval, etc.

On a larger scale, the system of Figure 1 may be employed in an office building or campus of buildings, for example, and can include a much larger LAN and numerous LAN devices, such as print servers, file servers, compute servers, communications servers, etc. The equipment 12 may also include or connect to a private branch exchange (PBX) or similar device for providing private telephone service and connections to the public telephone network.

The data outlet 10 is coupled to the premises equipment/data infrastructure 12 by one or more links 20. For example, a link 20 in a home may employ the home's telephone wiring. A wireless link may be used as well, either alone or in conjunction with a wired link. In a commercial setting, the link 20 may include data cabling such as coaxial cabling, unshielded twisted pair cabling, etc. The communications protocol employed over the link 20 may be one of several types, as described below.

Figure 2 shows a block diagram of the data outlet 10 in a configuration suitable for commercial deployment. The premises equipment link 20 is connected to premises equipment (PE) interface circuitry 30. The wireless link 18 (Fig. 1) terminates at physical-layer wireless interface circuitry 32, which is associated with master logical link control (LLC) circuitry 34 and slave LLC circuitry 36. One or more of the wired connections 14 (Fig. 1) terminate at wire interfaces 38, each of which includes media access control (MAC) circuitry and physical-layer circuitry (not shown in Fig. 2). Auto-sense circuitry (not shown) within each interface 38 automatically determines the data rate at which the associated wire link 14 should be operated.

The wireless interface circuitry 32, 34 and 36 preferably operate according to an emerging master-slave wireless communication protocol known by the name "Bluetooth". Alternatively, this circuitry may implement an interface to an infrared (IR) wireless link, or it may be part of a wireless local area network (LAN) operating according to the IEEE 802.11 wireless communication standard.

A 4-port bridge 40 provides link-layer connectivity among the interfaces 30, 34, 36 and 38. Within the bridge 40 may be a management processor (not shown) for performing certain desirable functions, some of which are described below. There may be a separate processor interface 42 to enable external equipment (not shown) to access the management processor. Optional display circuitry 44 may be used to convey status and other information to a user. For example, the display circuitry 44 may consist of several light-emitting diodes (LEDs) or a small liquid crystal display (LCD) panel.

The basic function of the bridge 40 is transferring data packets between the PE link 20 and the various user interfaces 32 and 38, following programmable rules for allocating available communications bandwidth among the different traffic streams. The bridge 40 may also include a range of additional functions, such

as data encryption and user authentication. It may be desirable that the wireless interface 32 and one or more wire interfaces 38 be viewed as a redundant set of communication channels, enabling a user to access the premises equipment 12 through one channel even if the other is malfunctioning or otherwise unavailable. For example, in the event that a user's wire connection to an interface 38 is faulty, the user can communicate via the wireless interface 32. On the premises side, the bridge 40 may be capable of determining whether the data rate obtainable using one link 20 to the premises equipment is greater than the data rate that can be obtained by another, and automatically select the link having the higher data rate. In particular, in the event that a wired link 20 is of poor quality, the bridge 40 may choose to employ a wireless link 20 to communicate with the premises equipment 12.

Additionally, "self service" management functions may be provided in order to enhance the user-friendliness of the data infrastructure 12. The optional management processor (not shown) can be programmed to provide such functions. For example, there may be routines for executing diagnostics and communicating status to the user. A diagnostic may detect when there is a faulty wired connection between the data outlet and the user, and inform the user of this situation via the wireless interface 32. These functions may be accessible to a user via a hypertext page stored in the management processor and provided to the user via a standard browser running on the user's personal computer or other data device. In addition to such diagnostic and status functions, this hypertext page may contain links or pointers to other pages within the data infrastructure 12 (Fig. 1) that describe available data services. When the user clicks on such a link, the request is redirected onto the premises link 20, and any response from equipment within the data infrastructure 12 is forwarded to the user data device via the appropriate user interface 32 or 38.

Figure 3 shows a slightly different version of the data outlet 10 that is suitable for use in a home or small office. As

shown, wireless interface components 32', 34' and 36' operate according to the Bluetooth standard. An interface to a standard telephone is provided by "plain old telephone service" (POTS) interface circuitry 50. User data communications occur via an Ethernet interface 52. Three low-pass filters 54 and corresponding "clipjack" connectors 56 provide interfaces to the home or small office cabling, which may be standard telephone wiring. The various interfaces are physically and logically interconnected by a 5-port bridge 40', which may contain a management processor (not shown) as described above.

In an alternative embodiment, the bridge circuitry 40' may implement voice-over-Internet-Protocol (IP) technology. Such a configuration would allow for the connection of digital telephones known as "IP telephones".

Figure 4 shows a rear view of a housing for a version of the data outlet 10 such as shown in Figure 3. The housing 60 is formed of rigid material in the shape of an outlet box suitable for mounting on a wall in a manner similar to the mounting of conventional telephone jacks. The clipjack connectors 56 terminate standard 4-wire telephone cable 62, and connect to the back of the housing 60 as shown. This configuration is beneficial because it enables proper termination of each segment of the house wiring, enabling higher data transmission rates than is generally available on poorly-terminated wiring.

Figure 5 shows a rear view of an alternative housing 60' that employs a modular telephone plug 70 to connect to an existing telephone jack. This version has the drawback that it creates a "stub" on the telephone wiring, rather than a well-matched termination as is possible with the housing 60 of Figure 4, and therefore the maximum data transmission rate on the wiring may be less than that obtainable with the configuration of Figure 4. However, this version is easily installed by being plugged into an existing telephone jack. This configuration may be suitable for

users for whom convenience is important and whose communications needs may be more modest.

In general, it is expected that the data outlet 10 obtains its electrical power directly from the wiring to which it attaches, preferably as direct current (DC). In installations having more than a small number of data outlets, it may be beneficial to employ a power supply to provide this DC power to the wiring from a local power source, such as AC house power. In one embodiment, this DC power supply may itself be packaged in a housing like those of Figure 4 or Figure 5, wall mounted at a suitable location, and connected to the installation wiring via a connector such as connectors 56 or 70 via which DC power is supplied to the wiring.

From the perspective of circuit packaging, it may be beneficial to arrange the internal cavity (not shown) of the housing 60 or 60' to accept standard circuit cards such as those conforming to the Personal Computer Memory Card International Association (PCMCIA) standard. In such a case, the data outlet 10 can be configured in a variety of ways, and can be upgraded over time if desired.

A flexible data outlet and certain specific alternative features or arrangements have been described. It will be apparent to those skilled in the art that other modifications to and variations of the disclosed data outlet are possible without departing from the inventive concepts disclosed herein, and therefore the invention should not be viewed as limited except to the full scope and spirit of the appended claims.

CLAIMS

What is claimed is:

1. A communications outlet, comprising:

a housing configured for placement in an operating area of a user;

user interface circuitry in the housing, the user interface circuitry being operative to provide an interface to user equipment located generally in the user operating area, the user equipment including a user telephone device and a user data device, the interface to the user equipment including a link-layer interface to the user data device;

premises interface circuitry in the housing, the premises interface circuitry being operative to provide an interface to premises equipment located generally outside the user operating area, the premises equipment including data processing equipment and telephone communications equipment providing access to a public telephone network; and

bridge circuitry in the housing, the bridge circuitry being operative to establish communications connections between the user interface circuitry and the premises interface circuitry.

2. A communications outlet according to claim 1, wherein the housing is attachable to a wall.

3. A communications outlet according to claim 2, wherein the housing is attachable to a wall in a permanent manner.

4. A communications outlet according to claim 3, wherein the housing is configured to be disposed in an opening of a wall and secured to the wall at the edges of the opening.

5. A communications outlet according to claim 4, further comprising connectors for connecting the premises interface circuitry to wiring within the wall in a splice fashion.

6. A communications outlet according to claim 2, wherein the housing is attachable to a wall in a removable manner.

7. A communications outlet according to claim 6, wherein the housing includes a plug for insertion into a modular telephone jack.

8. A communications outlet according to claim 1, wherein the interfaces to the user equipment and the premises equipment include wired and wireless connections.

9. A communications outlet according to claim 8, wherein at least one of the wired connections conforms to a carrier sense multiple access communications protocol.

10. A communications outlet according to claim 8, wherein at least one of the wireless connections conforms to a master-slave communications protocol.

11. A communications outlet according to claim 8, wherein the bridge circuitry is operative to automatically use one of the wireless connections to communicate with the premises equipment if the obtainable data rate is greater than the data rate that can be obtained by a wired connection to the premises equipment.

12. A communications outlet according to claim 1, wherein the premises interface circuitry includes an interface to a private branch exchange.

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13. A communications outlet according to claim 1, wherein the user telephone interface is an analog telephone interface.

14. A communications outlet according to claim 1, wherein the user telephone interface is a digital telephone interface.

15. A communications outlet according to claim 1, further comprising a processor operative to provide high-level services to the user via the user data interface.

16. A communications outlet according to claim 15, wherein the high-level services include data encryption.

17. A communications outlet according to claim 15, wherein the high-level services include user authentication.

18. A communications outlet according to claim 15, wherein the high-level services include diagnostics and status reporting to the user.

19. A communications outlet according to claim 15, wherein the diagnostics are operative to detect problems with a connection to the user, and wherein the status reporting is operative to notify the user of the detected connection problems.

20. A communications outlet according to claim 1, further comprising power circuitry operative to receive DC power from one of the interfaces.

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ABSTRACT OF THE DISCLOSURE

A flexible data outlet includes a housing configured for placement in an operating area of a user, such as on a wall adjacent to a user's work space. User interface circuitry in the housing provides an interface to user equipment located in the user operating area, including a user telephone device and a user data device such as a personal computer. The user interface circuitry includes a link-layer interface to the user data device. Both wired and wireless user connections are supported. Premises interface circuitry in the housing provides an interface to premises equipment located generally outside the user operating area. The premises equipment includes data processing equipment and telephone communications equipment providing access to a public telephone network. Bridge circuitry in the housing provides communications connections between the user interface circuitry and the premises interface circuitry in a flexible manner, enabling the provision of a variety of information services to the user. An optional management processor can provide diagnostic and other information to the user via hypertext pages. The data outlet is packaged in a housing similar to the housing used for a standard telephone wall jack, and is connected to telephone wiring or other available wiring.

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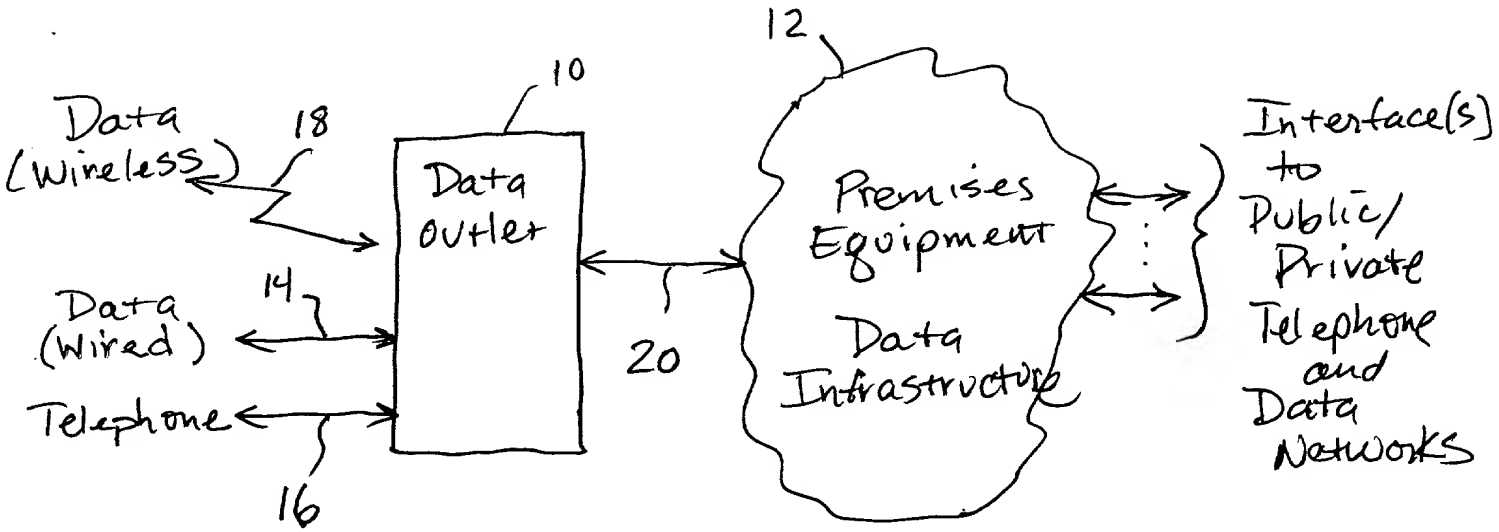

Fig. 1

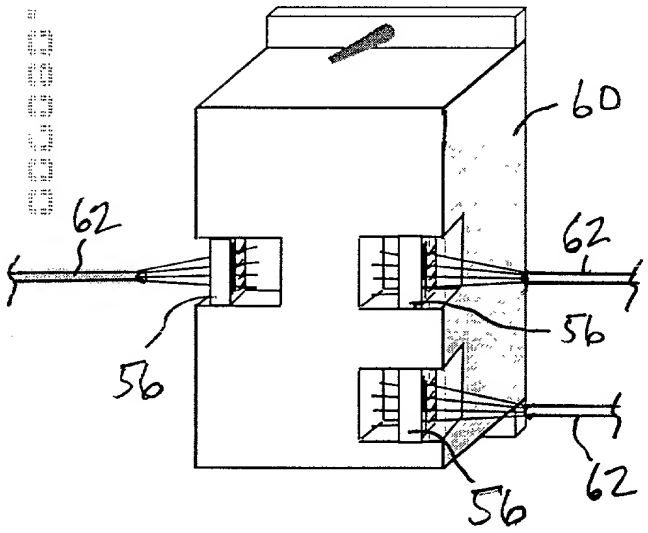

Fig. 4

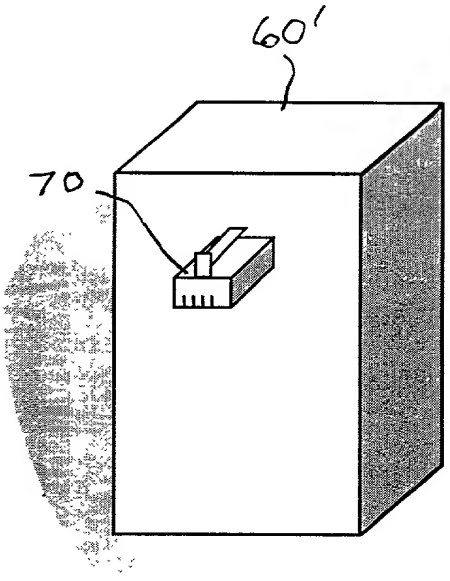

Fig. 5

Express Mail No.

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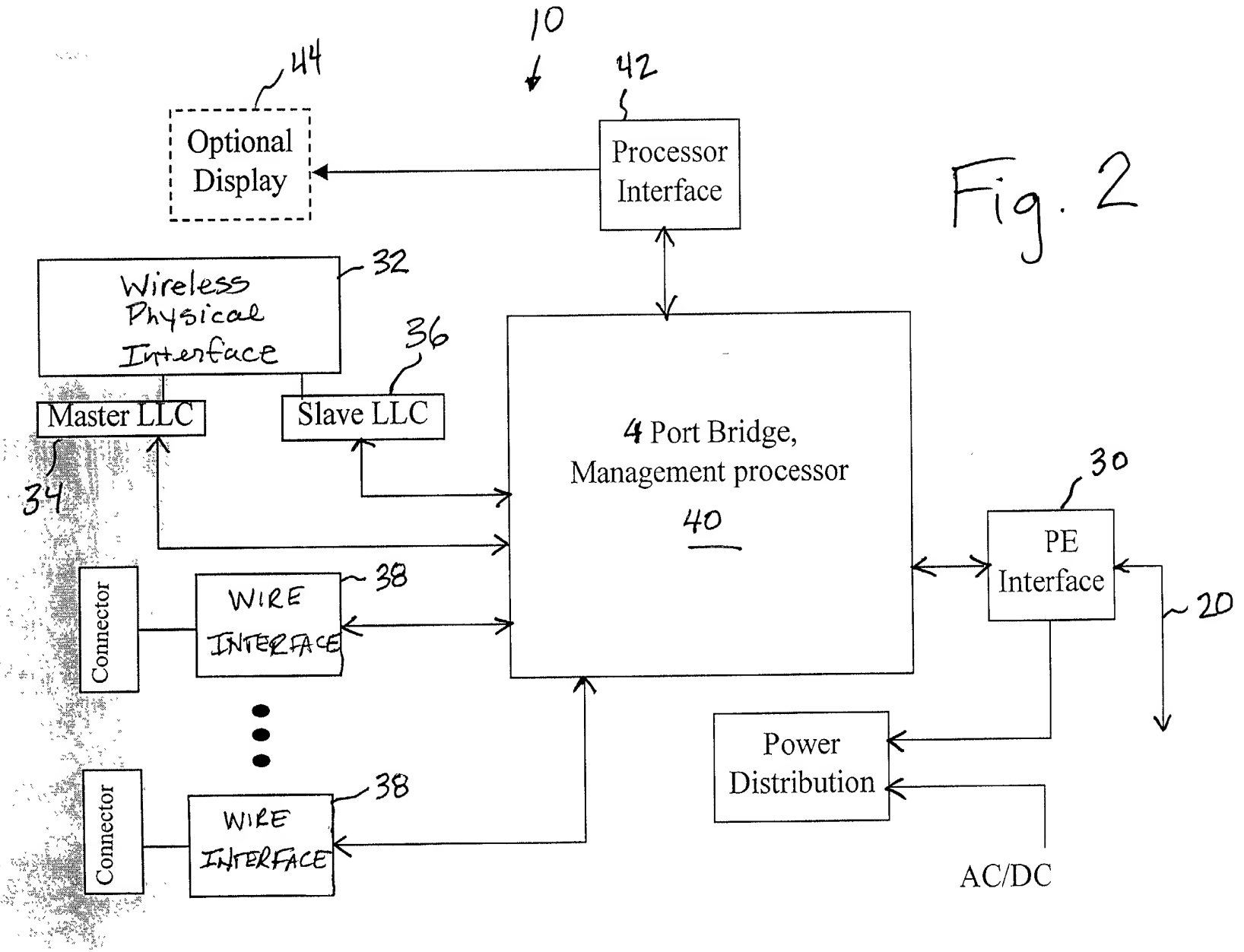
10
44
Optional Display
42
Processor Interface
32
Wireless Physical Interface
36
Master LLC
Slave LLC
34
4 Port Bridge, Management processor
40
30
PE Interface
20
Connector
WIRE INTERFACE
38
Connector
WIRE INTERFACE
38
Power Distribution
AC/DC

Fig. 2

SUBSTITUTE SHEET

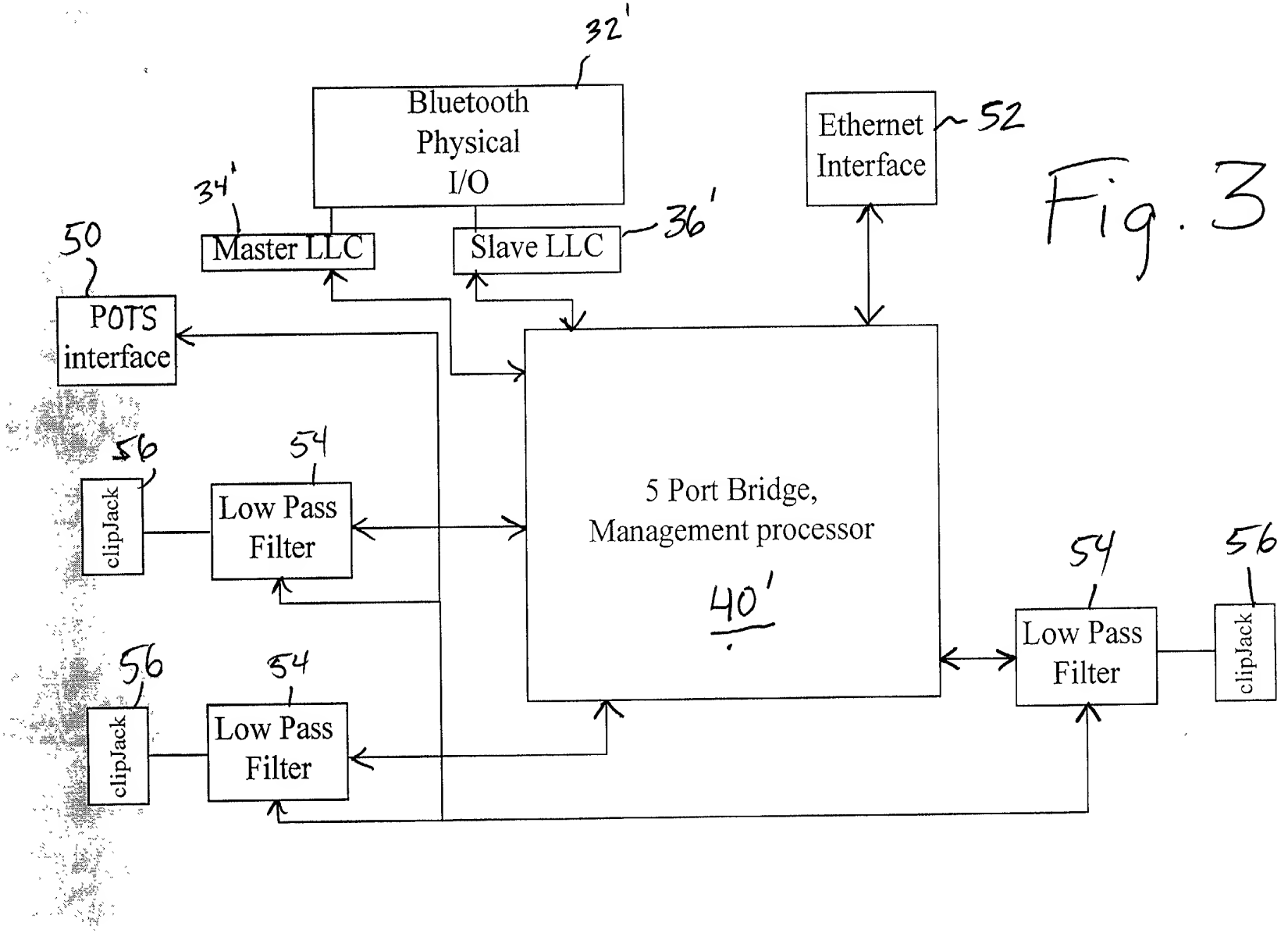

Fig. 3

3/3

Attorney Docket No.: SYNER-163XX

DECLARATION AND POWER OF ATTORNEY

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

FLEXIBLE DATA OUTLET

the specification of which (check one):

[X] **is attached hereto.** [ ] **was filed** _____ **as Application No.** _____**;**
amended on _____ **(if applicable).**

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).

I hereby claim foreign priority benefits under Title 35, USC §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)		Date Filed	Priority Claimed
_____ (Number)	_____ (Country)	_____ (Day/Month/Year)	[ ] Yes [ ] No
_____ (Number)	_____ (Country)	_____ (Day/Month/Year)	[ ] Yes [ ] No
_____ (Number)	_____ (Country)	_____ (Day/Month/Year)	[ ] Yes [ ] No

I hereby claim the benefit under Title 35, USC §119(e) of any United States provisional application(s) listed below:

60/201,956 (Application Number)	May 5, 2000 (Filing Date)
_____ (Application Number)	_____ (Filing Date)
_____ (Application Number)	_____ (Filing Date)

Express Mail No.

EL418426735US

Attorney Docket No.: SYNER-163XX

I hereby claim the benefit under Title 35 USC §120 of any United States application(s) listed below and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35 USC §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application No.)	(Filing Date)	(Patented/pending/abandoned)
(Application No.)	(Filing Date)	(Patented/pending/abandoned)
(Application No.)	(Filing Date)	(Patented/pending/abandoned)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) to prosecute this application and transact all business connected therewith in the Patent and Trademark Office, and to file with the USRO any International Application based thereon.

Stanley M. Schurgin, Reg. No. 20,979
Charles L. Gagnebin III, Reg. No. 25,467
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Victor B. Lebovici, Reg. No. 30,864
Eugene A. Feher, Reg. No. 33,171
Beverly E. Hjorth, Reg. No. 32,033
Holliday C. Heine, Reg. No. 34,346
Gordon R. Moriarty, Reg. No. 38,973

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Post Office Address: 11 Penzance Road	City: Rockport	State **or** Country: Massachusetts — Zip Code: 01966
Signature: (Please sign and date in permanent ink.) **X** James S. Hiscock		**Date signed:** **X** Aug. 8, 2020

Full Name of Second Inventor: Kiwon Chang		
City of Residence: Needham	State **or** Country: Massachusetts	Country of Citizenship: USA
Post Office Address: 62 Rivard Road	City: Needham	State **or** Country: Massachusetts — Zip Code: 02192
Signature: (Please sign and date in permanent ink.) **X** Kiwon Chang		**Date signed:** X 8/8/00

Attorney
Docket No.: SYNER-163XX

Full Name of Third Inventor:			
Floyd Backes			
City of Residence Sharon	State **or** Country New Hampshire	Country of Citizenship USA	
Post Office Address 405 Spring Hill Road	City Sharon	State **or** Country New Hampshire	Zip Code 03458
Signature: (Please sign and date in permanent ink.) **X** [signature]		**Date signed:** **X** 25-JULY-2000	

Full Name of Fourth Inventor: Myles Kimmit		
City of Residence Shewsbury	State **or** Country Massachusetts	Country of Citizenship USA
Post Office Address 1 Kemble Drive	City Shewsbury	State **or** Country Zip Code Massachusetts 01545
Signature: (Please sign and date in permanent ink.) **X** Myles Kimmit		**Date signed:** **X** 8/8/2020

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